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CURRICULUM VITAE

Saswati Chatterjee
Division of Virology
City of Hope National Medical Center & Beckman Research Institute
1500 E. Duarte Road, Duarte, CA 91010.
Phone: 626-301-8436 (sec); 626-301-8906 (direct); Fax: 626-301-8458
schatterjee@coh.org

EDUCATION

1976	B.Sc., McGill University, Montreal, CANADA
1978	M.Sc., McGill University, Montreal, CANADA
1982	Ph.D., McGill University, Montreal, CANADA

RESEARCH EXPERIENCE

1997-Present	Associate Research Scientist, Division of Pediatrics, City of Hope National Medical Center. The use of AAV vectors for stem cell gene therapy. Biology of AAV vectors. Gene therapy of AIDS, cancer and cardiovascular diseases.
Dec 1991- 6/97	Assistant Research Scientist, Division of Pediatrics, City of Hope National Medical Center and Dept. of Molecular Genetics, Beckman Research Institute of the City of Hope, Duarte CA. Development of AAV vectors for gene transfer into hematopoietic stem cells. Gene therapy of AIDS and Cancer.
1990 - 1991	Assistant Professor, Visiting Scientist, Division of Molecular Virology & Immunology, Dept. of Microbiology, Georgetown University School of Medicine, Rockville, MD. Transduction of intracellular resistance to virus replication (HIV-1 & HSV-1) using adeno-associated virus (AAV)-based vectors.
1986 - 1990	Visiting Associate with Dr. James Rose, Laboratory of Viral Diseases (Dr B. Moss, Lab Chief), NIAID, NIH, Bethesda, MD. Research in Molecular Virology: Induction of intracellular resistance to immunodeficiency viruses via transducing eukaryotic viral vectors. Development of an AAV-based vector system for gene transductions. DNA replication mechanisms of AAV.
1985 - 1986	Research Fellow with Dr. Michael J. Rogers, Laboratory of Genetics, NCI, NIH, Bethesda, MD. Molecular Biology of the wild mouse Major Histocompatibility Complex.
1982 - 1985	Visiting Fellow with Dr. David H. Sachs Transplantation Biology Section, Immunology Branch, NCI, National Institutes of Health, Bethesda, MD. Immunochemistry and Immunogenetics of the murine Major Histocompatibility Complex.
1976 - 1982	Graduate research with Dr. P.K. Lala, Department of Anatomy, McGill University. The Immunobiology of Feto-maternal relationships.

1975 - 1976	B.Sc. project: Biochemical Genetics, with Dr. P. Hechtman, Dept. of Biology, McGill University and MRC Human Genetics Group.

TEACHING EXPERIENCE

1994-Present	City of Hope Graduate School faculty.
1980 - 1981	Gross Anatomy, Dept. of Anatomy, McGill University. Laboratory instructor to first year Medical students.
1980 - 1981	Surface Anatomy, Dept. of Anatomy, McGill University. Laboratory instructor to Physiotherapy Students
1979 - 1980	Medical Histology, McGill University. Laboratory instructor to first year Medical students.
1978 - 1979	Anatomy of the Head and Neck, Dept. of Anatomy, McGill University. Laboratory instructor to first year Dental students.
1972 - 1973	Mathematics - Teaching Assistant, Marianopolis College, Montreal.

HONORS & FELLOWSHIPS

1971 - 1973	Marianopolis College entrance and continuing scholarships
1973 - 1974	J.W. McConnell Scholarship in Science & Engineering, McGill University
1979	McGill University Faculty of Medicine Graduate Student Award
1979 - 1982	Conseil de la recherche scientifique du Quebec Graduate Studentship
1982	McGill University Dean's Honors' list
1982	Arthur W. Ham Graduate Student Award - Canadian Federation of Biological Societies.
1982	Mayo Foundation Fellowship.
1982	Medical Research Council Post Doctoral Fellowship.
1982 - 1985	Fogarty N.I.H. Visiting Fellowship.
1996	Moderator, oral presentation session on "Gene Therapy- Gene Transfer and Biology" American Society of Hematology 1996 annual meeting.
2001	Invited Faculty, American Society of Gene Therapy Annual meeting.

Manuscript Reviews:

Nature Medicine
Blood
Journal of Virology
Human Gene Therapy
Cancer Research
Journal of Immunotherapy
Pediatric Research
Biotechniques

COMMITTEES

1993	Ad Hoc Reviewer, National Heart Lung Blood Institute, NIH. In vitro expansion of Hematopoietic Stem Cells.
1994	Ad Hoc Reviewer, National Institute of Allergy and Infectious Diseases, NIH. RFA: AI-93-12. Immune Reconstitution of HIV infected Individuals.
1996	Ad Hoc Reviewer, National Institute of Diabetes, Digestive and Kidney Diseases, NIH. RFA: DK: 95-006. Pathogenesis and Treatment of Cystic Fibrosis.
1996	Reviewer: American Society of Hematology 1996 annual meeting - Gene Therapy- Gene Transfer and Biology
1996-Present	City of Hope Research Animal Care Committee.
1998	Special Emphasis Panel: PAR-97-080 - Novel HIV therapies: Integrated preclinical/clinical program, NIAID, NIH.
1998	Special Emphasis Panel: PAR-98-007 Innovative Grant Program for Approaches in HIV Vaccine Research, NIAID, NIH.
1998	Special Review Panel: Gene Therapy Center Cores. NIDDK, NIH.
1999	Reviewer: American Society of Gene Therapy. Abstracts for presentation at 1999 annual meeting.
2000	Special Emphasis Panel: ZDK1 GRB-2 (M1). Correction of Hepatocytes with recombinant AAV for correction of genetic and metabolic abnormalities. NIDDK, NIH
2001	Reviewer: American Society of Gene Therapy: Abstracts for presentation at 2001 annual meeting.

RESEARCH GRANT AWARDS

1/92-12/92	City of Hope Cancer Center Seed Grant Award. **AAV vector-mediated gene transfer into primary peripheral blood leukocytes and bone marrow cells.** S. Chatterjee, Principal Investigator.
1/92-12/92	City of Hope Biomedical Research Support Grant. **A comparison of transduction efficiencies of adeno-associated virus-based vector with retroviral vectors.** S. Chatterjee, Principal Investigator.
10/92-9/93	City of Hope Cancer Center Seed Grant Award. **Construction and use of an adeno-associated virus vector encoding the MDR-1 gene.** S. Chatterjee, Principal Investigator.
10/92-9/96	1P01CA 59308. **Gene Therapy of Marrow Cells**. J. Zaia, Principal Investigator. National Cancer Institute, NIH, Gene Therapy Program, Program Project Grant: Project 1: **AAV-mediated gene transfer into hemopoietic cells.** S. Chatterjee, Project Leader. Project 2: **AAV vector safety and regulatory issues**. S. Chatterjee, Co-investigator.
9/96-9/97	No cost extension of CA59308.
11/92-10/95	3U01AI25959. J. Zaia PI. National Institute of Allergy and Infectious Diseases, NIH; National Cooperative Drug Discovery Grants (NCDDG) for the treatment of HIV Infection. Project: **Anti-SIV gene therapy in Rhesus Monkeys**. S. Chatterjee, Co-Investigator.
7/96-5/99	1R01AI40001. **Multivalent AAV vectors for HIV-1 gene therapy.** S. Chatterjee, Principal Investigator. National Institute of Allergy and Infectious Diseases, NIH. $540,014.
6/99-5/00	No cost extension of AI40001.
9/97-9/00	1R01CA75186. **Gene modified dendritic cells for tumor immunotherapy.** S. Chatterjee, Principal Investigator. National Cancer Institute, NIH. $685,475.
10/00-9/02	No cost extension of CA75186.
7/99-6/04	1PO1HL60898-01A1. **Gene therapy approaches for blood and vascular diseases**. KK Wong, Principal Investigator. National Heart, Lung, Blood Institute, NIH. $7,262,996 **Project 1: AAV Transduction of quiescent hematopoietic stem cells.** S. Chatterjee, Project leader. $1,040,014 direct cost. **Core B: Vector Core**. S. Chatterjee, Core leader. $928,159 direct cost.
4/00-3/03	1P01CA30206-19. Bone Marrow Transplantation for Hematologic malignancies. SJ Forman, Principal Investigator. Project IV. S. Chatterjee, Co-Investigator. $214,859 direct cost.

9/99-8/04	NIAID-DAIT-BAA-99-12.. Clinical Trials and Clinical markers of Immunologic Diseases. H. Oppenshaw, Principal Investigator; S. Chatterjee, Co-Investigator.
10/99-9/04	NIAID-DAIT-BAA-99-31. National Collaborative Study of Stem Cell Transplanatation for Autoimmune Disease. H. Oppenshaw, Principal Investigator; S. Chatterjee, Co-Investigator.

PATENTS & LICENSES

12/12/95	US Patent No.: 5,474,935. Saswati Chatterjee & K.K. Wong Jr.: **Adeno-associated virus (AAV)-based eukaryotic vectors.**
6/95	**AAV packaging cell lines.** Licensed by Applied Immune Sciences, San Jose, CA.
12/97	**Adeno-associated virus (AAV)-based eukaryotic vectors & AAV packaging cell lines.** Licensed by Strata Biosciences, Alameda, CA.

BIBLIOGRAPHY

1. **Chatterjee, S.** and Hechtman, P.: t-aminobutyric acid metabolism in brain homogenates of the spastic mouse. Biochem.Gen. 15: *1147-151*, 1977.

2. **Chatterjee S.**: Placental H-2 antigens and changes in the maternal lymphoid system during allogeneic pregnancy in the mouse. M.Sc. Thesis, McGill University, 1978.

3. **Chatterjee, S.**, and Lala, P.K.: The localization of H-2 antigens on mouse trophoblast cells. J. Exp. Med. 149: *1238-1253*, 1979.

4. **Chatterjee, S.**, Santer, V., and Lala, P.K.: Changes in maternal small lymphocyte subsets during allogeneic pregnancy in the mouse. Cell. Immunol. 50: *290-304*, 1980.

5. **Chatterjee, S.** and Lala, P.K.: MHC antigens on mouse trophoblast cells: absence of Ia antigens despite the presence of H-2K and D. J. Immunol. 127: *2070-2073*, 1981.

6. **Chatterjee S.**, and Lala, P.: Localization of paternal H-2K antigens on murine trophoblast cells in vivo. J. Exp. Med. 155: *1679-1689*, 1982.

7. **Chatterjee, S.**: The immunobiology of feto-maternal relationship. Ph.D. Thesis, McGill University, 1982.

8. **Chatterjee, S.**, Montgomery, B., and Lala, P.K.: Alloantigenicity of trophoblast cells. Amer. J. Reprod. Immunol. 3: *127-131*, 1983.

9. Lala, P.K., **Chatterjee, S.**, and Montgomery, B.: Major histocompatibility antigens on murine and human

trophoblast cells. Transplant. Proc. 15: *883-886*, 1983.

10. Lala, P.K., **Chatterjee, S.**, Kearns, M., Montgomery, B., and Colavincenzo, V. Immunobiology of the Feto-Maternal Interface. Immunol. Rev. 75: *87-116*, 1983.

11. **Chatterjee, S.**, Parhar, R. and Lala, P.K.: An Evaluation of the Maternal Natural Killer Cell Population during the course of Murine Pregnancy. Cell Immunol. 84: *264-275*, 1984.

12. Bluestone, J.A., Potter, T.A., **Chatterjee, S.**, and Rajan, T.V.: CTL recognize different determinants from those defined serologically on L^d somatic cell mutants. J.Immunol. 133:*1168-1173*, 1984.

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14. **Chatterjee, S.**, Schlauder, G., Sachs, D.H., Glimcher, L.H., Paul, W.E., and McKean, D.J.: A biochemical analysis of $I\text{-}A^k$ molecules from mutant antigen presenting cell lines. Immunogenetics 23: *121-125*, 1986.

15. **Chatterjee, S.**, Lillehoj, E., Hernandez, D.M., Coligan, J.E. and Sachs, D.H.: Analysis of the D-region products of H-2q using monoclonal antibodies reveals the expression of a new class 1-like molecule. Immunogenetics 25: *7-14*, 1987.

16. Rabinowitz, R., Sharrow, S.O., **Chatterjee, S.**, Rogers, M.J., and Sachs, D.H.: Qa alloantiantigen expression on functional T lymphocytes from spleen and thymus. Immunogenetics 24: *391-401*, 1987.

17. **Chatterjee, S.**, Wong K.K., Rose J.A. and Johnson, P.R. : Transduction of intracellular resistance to HIV production by an adeno-associated virus-based antisense vector. *In* Vaccine 91: Modern approaches to new vaccines including the prevention of AIDS. R.M. Channock, H.S. Ginsberg, F. Brown and R.A.Lerner Eds. Pp 85-90. Cold Spring Harbor Laboratory Press. 1991.

18. Wong K.K., Rose J.A. and **Chatterjee, S.**: Restriction of HSV-1 production in cell lines transduced with an antisense viral vector targeting the ICP4 gene. *In* Vaccine 91: Modern approaches to new vaccines including the prevention of AIDS. R.M. Channock, H.S. Ginsberg, F. Brown and R.A.Lerner Eds. Pp 183-189. Cold Spring Harbor Laboratory Press. 1991.

19. Wong K.K. and **Chatterjee, S.**: Controlling herpes simplex virus (HSV) infections: Intracellular immunization, the way of the future? Current Topics in Microbiology and Immunology , B. Rouse, Editor. Springer Verlag 179: *159-174*, 1992.

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21. Zaia, J.A, **Chatterjee, S.**, Wong, K.K., Elkins, D., Taylor, N.R. and Rossi, J.J.: Status of ribozyme and antisense-based developmental approaches for anti-HIV-1 therapy. *In* Antisense Strategies. The Annals of the New York Academy of Sciences, 660: *95-106*, 1992.

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23. Podsakoff GM, Wong KK and **Chatterjee, S**. Stable and efficient gene transfer into non-dividing cells by adeno-associated virus-based vectors. J. Virol. 68: *5656-5666,* 1994.

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25. **Chatterjee S,** Wong KK, Lu D, Permana PA and Podsakoff GM. Novel approaches for efficient gene transfer into hematopoietic progenitor cells: the use of adeno-associated virus vectors. Bone Marrow Transplantation, 15: *S309-S313,* 1995.

26. **Chatterjee S**, Lu D, Podsakoff GM, Wong, KK. Strategies for efficient gene transfer into hematopoietic cells: The use of adeno-associated virus vectors in gene therapy. The Annals of the New York Academy of Sciences. 770: *79-90,* 1995.

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29. Wong KK and **Chatterjee S**. Adeno-associated virus vectors as antivirals. Current Topics in Microbiology and Immunology. Giraud and Berns Ed. Springer Verlag 218: *145-170,* 1996.

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34. **Chatterjee S**, Li W, Wong C, Lu D, Fisher-Adams G, Guha M, Macer J, Forman SJ and Wong KK. Transduction of primitive human marrow and cord blood-derived hematopoietic progenitor cells with adeno-associated virus vector. Blood. 93:1882-1894, 1999.

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Ribozyme Applications: Principles and Protocols." JJ Rossi and L Couture Eds. pp189-215, Horizon Scientific Press. 2000.

37. Wong KK and **Chatterjee S**. Parvovirus Vectors for the Gene Therapy of Cancer. *In* Gene Therapy of Cancer. Second Edition, E. Lattime and S. Gerson Eds. Academic Press. 2001. *In Press.*

38. Sun J, Krouse RS, Forman SJ, Senitzer D, Sniecinski I, **Chatterjee S** and K.K. Wong Jr. Immunogenicity of a P210BCR-ABL Fusion Domain Candidate DNA Vaccine Targeted to Dendritic Cells by an rAAV Vector In Vitro. Blood. *In Review.*

37. Wong CA, Li W, Forman SJ, Wong KK, **Chatterjee S**. Gene transfer into quiescent CD34+CD38- hematopoietic progenitor cells in G0 with adeno-associated virus vectors. *In preparation.*

38. Fisher-Adams G, Wong KK and **Chatterjee S**. Long term transcriptional potentials of genes encoded by integrated AAV vectors in transduced cell lines. *In preparation.*

39. Li LJ, Brar D, Permana P, Rossi JJ, Wong KK and **Chatterjee S** . Promoter strengths and orientation dependance of transgene expression from multivalent AAV vectors. *In preparation.*

40. Li LJ, Rossi JJ, Forman SJ , Wong KK and **Chatterjee S**. Long term inhibition of HIV-1 replication in progeny macrophages derived from CD34+ hematopoietic progenitor cells transduced with AAV vectors encoding anti-HIV genes. *In preparation.*

41. Wong KK, Rosborough E, Aye T and **Chatterjee S**. Permanent packaging cell lines for the production of adeno-associated virus vectors. *In preparation.*

ABSTRACTS & PRESENTATIONS.

1. **Chatterjee, S.**: Localization of major histocompatibility antigens on mouse trophoblast cells. Anat. Rec. 193: 502-503, 1979.

2. **Chatterjee, S.** and Lala, P.K.: Localization of mouse trophoblast cells. Fed. Proc. 38:929,1979.

3. **Chatterjee, S.**, and Lala, P.K.: Characterization of maternal small lymphocyte subsets during allogeneic pregnancy. Proc. Can. Fed. Biol. Soc. 1979.

4. **Chatterjee, S.**, and Lala, P.K.: Ia antigens on mouse trophoblast cells. Proc. Can. Fed. Biol. Soc., 1980.

5. **Chatterjee, S.**, and Lala, P.K.: MHC antigens on mouse trophoblast cells. Presented at the Fourth International Congress of Immunology, Paris and 7th International Convocation on Immunology: Immunobiology of the Major Histocompatibility Complex, Buffalo, NY, USA, 1980.

6. **Chatterjee, S.**, and Lala, P.K.: Surface marker analysis of maternal T lymphocyte subsets during pregnancy. International Conference on Reproductive Immunology, Banff, Alberta, Canada. J.Reprod.Immunol.,Suppl. S25, 1981.

7. **Chatterjee, S.**, and Lala, P.K.: Natural killer cell activity during murine pregnancy. International Conference on Reproductive Immunology, Banff, Alberta, Canada. J.Reprod. Immunol. Suppl. S24, 1981.

8. **Chatterjee, S.**, and Lala, P.K.: Surface marker characterization of maternal T lymphocyte subsets during pregnancy. Proc. Can. Fed. Biol. Soc. 24: 140, 1981.

9. **Chatterjee, S.**, and Lala, P.K.: In situ localization of H-2K antigens. Fed. Proc. 41(3): 426, 1982.

10. **Chatterjee, S.**, and Lala, P.K.: In vivo localization of H-2K antigens. Fed. Proc. 41(3): 426, 1982.

11. Lala, P.K., and **Chatterjee, S.**: A comparison of host natural killer cell responses during tumour-bearing and pregnancy. Proc. Can. Fed. Biol. Soc. 24: 140,1982.

12. **Chatterjee, S.**, and Lala, P.K.: In situ localization of paternal H-2K antigens on trophoblast cells. Amer. J. Reprod. Immunol. 2(3): 170, 1982.

13. Lala, P.K., **Chatterjee, S.**, and Montgomery, B.: Major histocompatibility antigens on murine and human trophoblast cells. Proc. IX Intl. Congress Transplant. Soc., Brighton, U.K., 1982.

14. **Chatterjee, S.**, Hernandez, D.M., and Sachs, D.H.,: An immunochemical analysis of the products of the D region of H-2^q. Fed. Proc. 42: 1370, 1983.

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16. Schlauder, G., Beck, B.,Bell, M., Chase, C., **Chatterjee, S.**, Glimcher, L., Paul, W., Pierres, M., Sachs, D. H., and McKean, D.J.: Biochemical characterization of mutant I-A^k molecules from antigen presenting B cell - B lymphoma hybridomas. Fed. Proc. 43: 1599, 1984.

17. **Chatterjee, S.**, Hernandez, D.M. and Sachs, D.H.: An analysis of the antigens encoded by the D - region of H-2^q. 10th Ann. Cong. Transplant. Soc., Minneapolis, 1984.

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20. **Chatterjee,S.**, Wong, K.K. Jr., Rose, J.A. and Johnson, P.R.: Establishment of intracellular resistance to human immunodeficiency virus replication. Cold Spring Harbor Meeting: RNA Tumour Viruses, NY., May 23-25, 1990.

21. **Chatterjee, S.**, Johnson, P.R. and Wong, K.K. Jr.: Transduction of intracellular resistance to HIV production by an adeno-associated virus-based antisense vector. Cold Spring Harbor Meeting: Modern Approaches to New Vaccines Including the Prevention of AIDS, NY, September 12-16, 1990.

22. Wong. K.K., Rose, J., **Chatterjee, S.**: Restriction of HSV-1 replication in cell lines transduced with an antisense viral vector targeting the HSV-1 ICP4 gene. Cold Spring Harbor Meeting: Modern Approaches to New Vaccines , NY, September 12-16, 1990.

23. **Chatterjee, S.** and Wong, K.K. : Transduction of intracellular resistance to virus replication using adeno-associated virus-based vectors. The Second International Conference on Catalytic RNA as anti-HIV agents: Design and Delivery, San Diego, CA, October 21-24, 1990.

24. Wong, K.K., Rose J. A. and **Chatterjee, S.**: Inhibition of herpes simplex virus type 1 (HSV-1) production in cell lines transduced with an adeno-associated virus based antisense vector targeting the requisite ICP4 gene. The Second International Conference on Catalytic RNA as anti-HIV agents: Design and Delivery, San Diego, CA, October 21-24, 1990.

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28. Wong. K.K. and **Chatterjee, S.** Transduction of intracellular resistance against HIV utilizing an adeno-associated virus-based vector: potential for antiviral gene therapy. 32nd Annual ICAAC Meeting, Anaheim, October 11-14, 1992.

29. **Chatterjee, S.**, Wong, K.K., Podsakoff, G., Zaia, J., Forman, S. Adeno-associated virus vectors for high efficiency gene transfer into primary human hematopoietic cells. American Society of Hematology. Blood 80: Suppl 1, 167A, 1992.

30. **Chatterjee, S.**, Podsakoff, G., Wong K.K. Strategies for antiviral gene therapy: Use of an Adeno-associated virus (AAV)-based vector system to confer intracellular resistance to targeted viruses. Third International Symposium on catalytic RNAs (ribozymes) and targeted gene therapy for the treatment of HIV infection. Invited talk at San Diego, December 6-11, 1992.

31. **Chatterjee S**, Podsakoff, G.M. and Wong K.K.: A Gene Therapeutic Approach to AIDS: Adeno-Associated Virus Vectors for the Delivery of Genes Encoding Antisense RNA and Ribozymes Targeting HIV-1. Invited talk for Coordinated Therapies for HIV-1 Infection. Washington DC, July 1993.

32. **Chatterjee S**, Podsakoff, G.M. and Wong K.K.: Adeno-associated virus vectors for the delivery of anti-HIV genes. Invited talk for Symposium on Genetic Therapies for HIV-1 Infection. , p 441, 33rd ICAAC Meeting, New Orleans, LA, October, 1993.

33. Wong, K.K., Podsakoff, G., Lu, D. and **Chatterjee, S.** High efficiency gene transfer into growth arrested cells utilizing an adeno-associated virus-based vector. Blood *82*, Suppl.1, 302a,1993

34. Snyder, D., Wu Y., Wong, K.K., **Chatterjee, S.** and Forman, S.J. Ribozyme-viral vector constructs inhibit BCR-ABL gene expression in Philadelphia-chromosome positive cell lines. Blood *82*, Suppl.1, 40, 1993.

35. Shaughnessy, E., Wong, K.K. and **Chatterjee, S.** Adeno-associated virus-based vectors: Biology and potential role in the gene therapy of cancer. Cancer Gene Therapy, *1*, Suppl. 1, 9,1993.

36. **Chatterjee S** Adeno-associated virus: a high efficiency vector for gene therapy. Invited talk for Keystone Symposia on Controversies on Bone Marrow Transplantation. January, 1994.

37. **Chatterjee S,** Wong KK, Podsakoff G, Lu D, Permana P and Brar D. Strategies for anti-HIV gene therapy: the use of adeno-associated virus vectors. Invited talk for UCLA AIDS Symposium, Palm Springs, CA, March 3-6, 1994.

38. Permana P, Wong KK, Brar D and **Chatterjee S.** Transcription of anti-HIV RNA from adeno-associated virus vectors encoding RNA polymerase II- and III-dependent promoters. Poster session. UCLA AIDS Symposium, Palm Springs, CA, March 3-6, 1994.

39. Shaughnessy, E., Wong, K.K., Podsakoff, G, Kane, S and **Chatterjee, S.** Adeno-associated virus vectors for MDR-1 gene therapy. Proc. Amer. Assoc. for Cancer Research *35*, 373, 1994.

40. Lu, D, **Chatterjee, S**, Brar, D and Wong KK. High efficiency in vitro cleavage of transcripts arising from the major transforming genes of human papillomavirus type 16 mediated by ribozymes transcribed from an adeno-associated virus vector. Proc. Amer. Assoc. for Cancer Research 35, 309, 1994.

41. **Chatterjee S**, Wong KK Jr, Podsakoff G, Shaughnessy E. Gene transfer into human hematopoietic progenitor cells by adeno-associated virus vectors for the treatment of malignancies. Third International Conference on the Gene Therapy of Cancer, Coronado, CA; November 10-12; Cancer Gene Therapy 1:323 (III-59), 1994.

42. Brar D, Wong KK Jr, Permana P, **Chatterjee S**. Promoter interactions in adeno-associated virus vectors encoding multiple gene cassettes: potential use in anti-oncogene vector design. Third International Conference on the Gene Therapy of Cancer, Coronado, CA; November 10-12, Cancer Gene Therapy 1:321 (V-53), 1994.

43. Wong KK, Brar D, Rossi J, **Chatterjee, S**. Primary human CD34+ peripheral blood stem cells (PBSCs) are efficient targets for adeno-associated virus vector-mediated gene transfer: Prospects for anti-AIDS genetic intervention. Blood, 84, Supplement 1, 743a; Nov 15, 1994. American Society of Hematology Meeting December 2-6, 1994, Nashville, Tenn. No.2957.

44. Podsakoff G, Shaughnessy EA, Lu D, Wong KK Jr, **Chatterjee S.** Long term in vivo reconstitution with murine marrow cells transduced with an adeno-associated virus vector. Blood, 84, Supplement 1, p. 256a; Nov 15, 1994. American Society of Hematology Meeting December 2-6, 1994, Nashville, Tenn. No.1009

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80. **S. Chatterjee.** RAAV vectors in vivo. American Society of Gene Therapy. Seattle 2001.

MAJOR INVITED TALKS

The Third International Symposium on Catalytic RNAs and Targeted Gene Therapy for the treatment of HIV infection. San Diego, December 6-11, 1992.

Coordinated Therapies for HIV-1 Infection. Washington DC, July 11-16,1993.

Symposium on Genetic Therapies for HIV-1 Infection. American Society for Microbiology, 33rd ICAAC Meeting, New Orleans October, 1993.

Keystone Symposia: Controversies on Bone Marrow Transplantation. Keystone, CO, January 23-30, 1994.

UCLA AIDS Symposium, Palm Springs, CA, March 3-6, 1994.

Symposium on Stem Cells: Prospects for the Clinic. J Mule & J Larrick, organizers. Palo Alto, CA, February 6-7, 1995.

New York Academy of Sciences Symposium on Bone Marrow Transplantation: Foundations for the 21st century. Orlando, FL, March 15-18, 1995. Robert Sackstein, organizer.

Hemopoietic Stem Cell Gene Therapy. Chevy Chase, MD. September 28-October 1, 1995. G. Stamatoyanopoulos, organizer.

AAV vectors: Gene transfer into quiescent cells. Bethesda, MD December 6, 1995. C. McKeon, RJ Samulski, organizers NIDDK, NIH.

AAV vectors for Gene Transfer into Stem Cells. Invited presentation to the Scientific Board of Systemix, Palo Alto CA, March 8, 1996.

FDA Gene Therapy Conference. July 11-12, 1996. Robert Anderson, Center for Biologics Evaluation and Research, FDA & Biological Resources Branch, NCI, NIH, organizer.

American Society of Hematology 1996 annual meeting. Moderator, oral presentation session on "Gene Therapy: Gene Transfer and Biology".

Annual Symposium on Gene Medicine. June 13, 1997. William McBride and James Economou, organizers. UCLA, Los Angeles, CA.

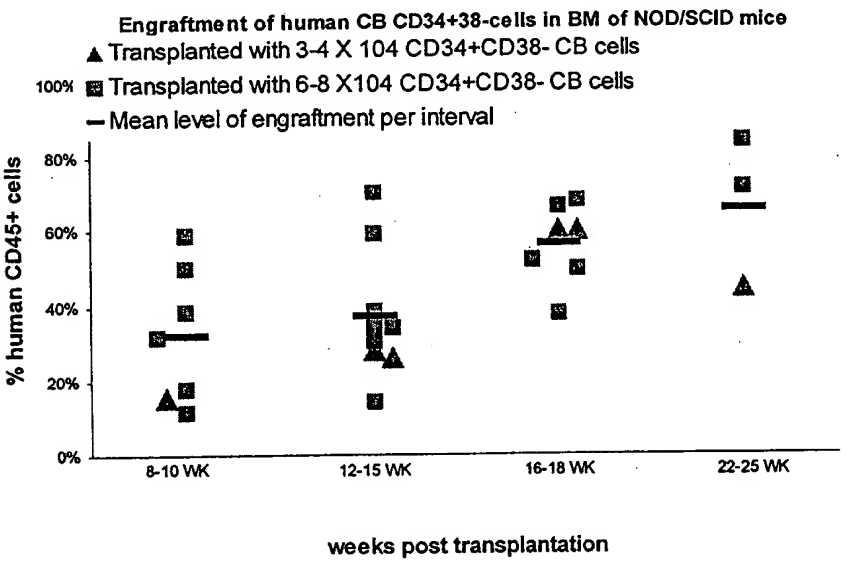
Principal Investigators Meeting, NHLBI, NIH, Rockville MD, July 6-7,2000. Sonia Skarlatos, organizer.

Symposium on Cardiovascular Gene Therapy 2000. September 21, 2000. PK Shah & T. Rajavashisth, organizers, Cedars Sinai Medical Center.

Annual Meeting of the American Society of Gene Therapy. Workshop on AAV vectors.. rAAV vectors in vivo. May 2001, Seattle, WA.

Analysis of CD34 cells subpopulations from OM. Shows that CD34+CD38- cells are in G0.

FIGURE 1


Engraftment of human CB CD34+38-cells in BM of NOD/SCID mice
Transplanted with 3-4 X 104 CD34+CD38- CB cells
Transplanted with 6-8 X104 CD34+CD38- CB cells
Mean level of engraftment per interval
100%
80%
60%
40%
20%
0%
% human CD45+ cells
8-10 WK
12-15 WK
16-18 WK
22-25 WK
weeks post transplantation

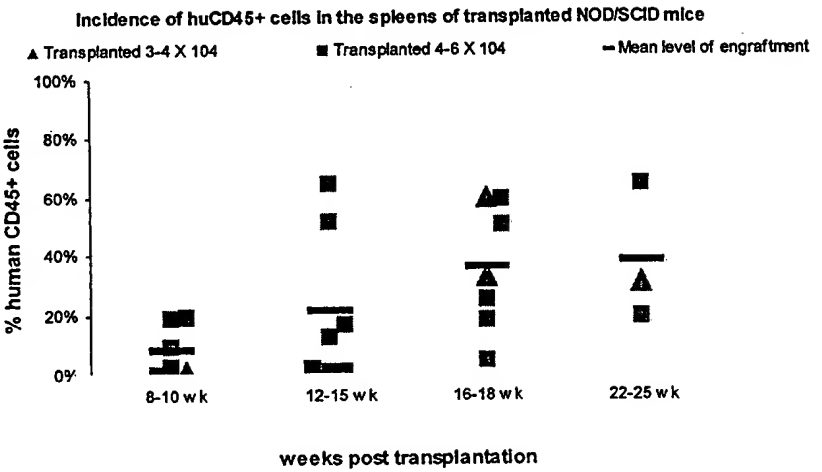
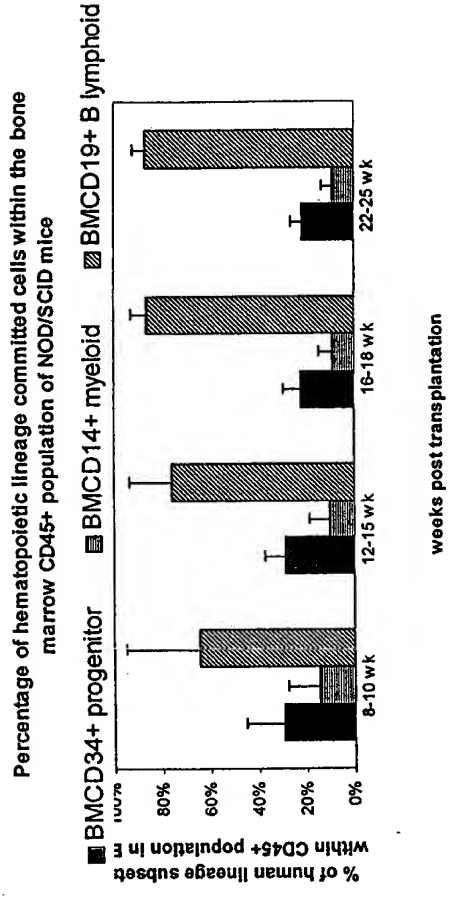

Incidence of huCD45+ cells in the spleens of transplanted NOD/SCID mice
▲ Transplanted 3-4 X 104
■ Transplanted 4-6 X 104
Mean level of engraftment
% human CD45+ cells
100%
80%
60%
40%
20%
0%
8-10 wk
12-15 wk
16-18 wk
22-25 wk
weeks post transplantation

FIGURE 2

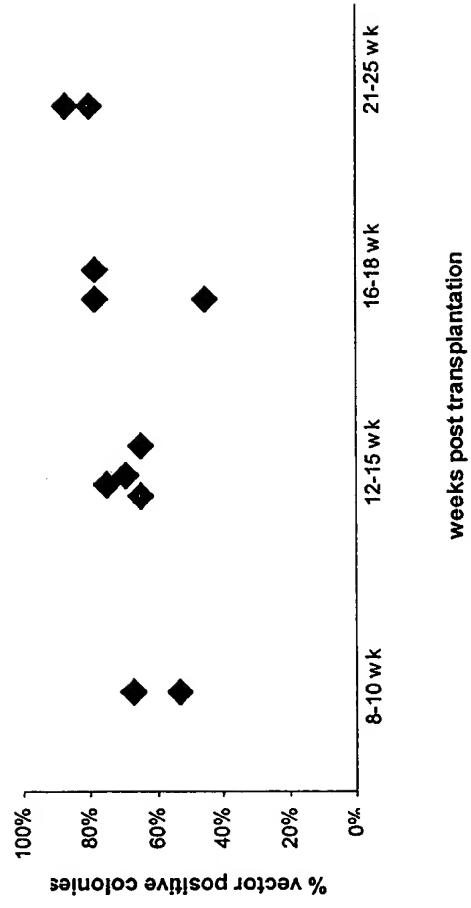
FIGURE 3


Percentage of hematopoietic lineage committed cells within the bone marrow CD45+ population of NOD/SCID mice
BMCD34+ progenitor
BMCD14+ myeloid
BMCD19+ B lymphoid
% of human lineage subset within CD45+ population in E
100%
80%
60%
40%
20%
0%
8-10 wk
12-15 wk
16-18 wk
22-25 wk
weeks post transplantation

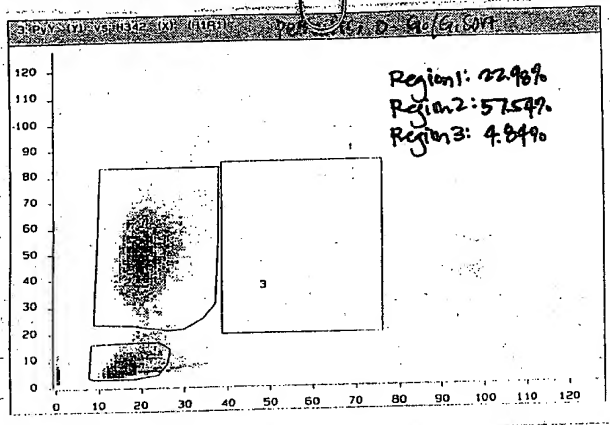
Weeks Post Transplant	Bone Marrow CD34+	CD14+	CD19+	Spleen CD19+
9-10	75% (3/4)	100% (4/4)	50% (2/4)	25% (1/4)
12-15	57% (4/7)	50% (3/6)	50% (3/6)	67% (4/5)
17-18	43% (3/7)	57% (4/7)	57% (4/7)	43% (3/7)
22-25	75% (3/4)	67% (2/3)	33% (1/3)	33% (1/3)
Total	**59% (13/22)**	**65% (11/17)**	**53% (9/17)**	**53% (9/17)**

TABLE 1

FIGURE 4


% vector positive colonies
100%
80%
60%
40%
20%
0%
8-10 wk
12-15 wk
16-18 wk
21-25 wk
weeks post transplantation

cont'd
Stained the rest of the CD34+ cells w/ Hoechst & Pyronin to sort for Go and G1 populations.



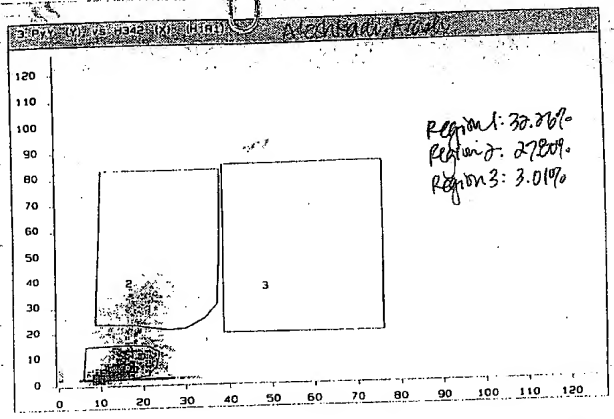
Bone Marrow sample today! 15mL

98-24-19 4
ATESHKADI ARASH
H / A 03/21/1968

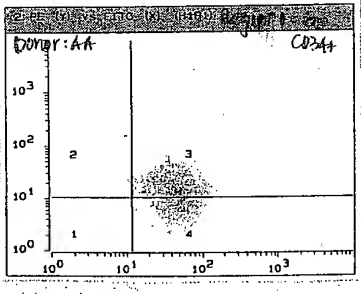
#Mononuclear cells = 1.3×10^8
#Total CD34+ = 2.8×10^6 ~2.2%
Stored Mononuclear cells O/N @ 4°C in 50% FCS

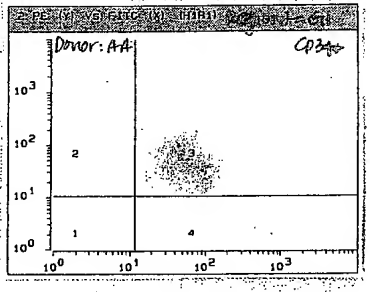
Isolated CD34+ from mononuclear cells today
Labeled → Ran through the column.
Total CD34+ count = 2.8×10^6 cells
Stored @ 4°C O/N in 50% FCS → Sort G0/G1 tomorrow!

: G_0/G_1 Sort: using 80% [ ] of Hoechst/Pyronin as usual.



performed CD34+ CD38- Abstain on cells sorted in Region 1 and Region 2.





Sort problems:

The cells gated for Region 1, 2 & 3 ~~were~~ shifted out → ∴ the cells analyzed were not the entire population.

CD34+CD38- Analysis.

Although there seems to be 2 diff. pop.'s of cells... I expected more

Donor/(Week#) **Ateshkadi, A. 6/11**	*(+)MP*	*(-)MP*	*% +MP*	*IP (<3)*	*IP (>3)*	*(-)IP*	*% +IP (<3)*	*% +IP (>3)*
CYTOKINES								
AA G0 CsCl (4)	2	22	**8.3**	39	37	206	**13.8**	**13.1**
AA G0 CsCl (6)	6	32	**15.8**	15	39	198	**6.0**	**15.5**
AA G0 CsCl (8)	4	28	**12.5**	20	35	200	**7.8**	**13.7**

80°c 2hr
ffer @ 42°c for 5 hr
p 75 λ c ~~[illegible]~~ 0.15 μg)

Tissue Total Counts cpm
50 112×10^6

ler w/in 2 blots

* Wash blot from
  65°c 2 x 15' 0.5XSSC, 0.1% SDS
* Precipitate down PCR products (and)
  -70°c 1 ul glycogen / sample
* Run hot PCR products c) on 5% Urea/polyacrylamide Gel

A, A G0 5 wk LTC-IC

No DNA | unTd 1 2 3 | Td CsCl 7 8 9 10 11 12 13 14 15 16 | ◻PAP 6 copy

No.1

HIV

400 cells

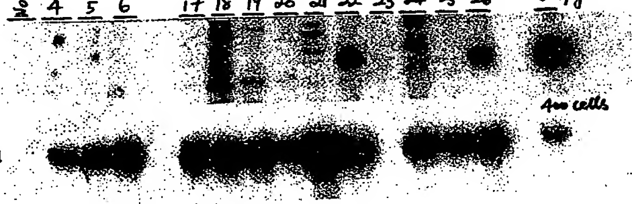
β-globin

A, A G0 5 wk LTC-IC

No DNA | unTd 4 5 6 | Td CsCl 17 18 19 20 21 22 23 24 25 26 | ◻PAP 6 copy

No.2

HIV



400 cells

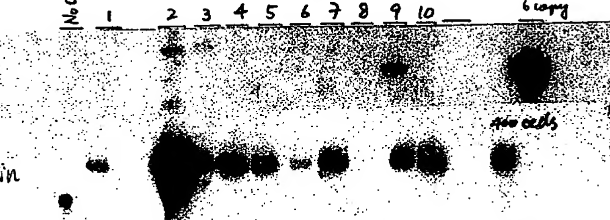
β-globin

A, A G1 5 wk LTC-IC

No DNA | unTd 1 | Td CsCl 2 3 4 5 6 7 8 9 10 | ◻PAP 6 copy

No.3

HIV



400 cells

β-globin

load 1/3 of HIVx, 1/2 of β-globin, 1/5 of positive control

400 V
80°c dry 2 hr

* Pick up colonies
MERCADO, ORFEDALIA ( )
5wk LTC-IC CD34+CD38- (

count colonies: unTd 157 (all CFU-GM except 9 E
Td 762 (all CFU-GM except 61 BF
All colonies are big and nice.

red colony.

Mature BFU-E (Day 10)
(3-8 multi-clustered)

pick up colonies:
For PCR: unTd: 1-4 (1-2: CFU-GM
3-4: BFU-E)
Td: 5-24 (5-21: CFU-GM
22-24: BFU-E)

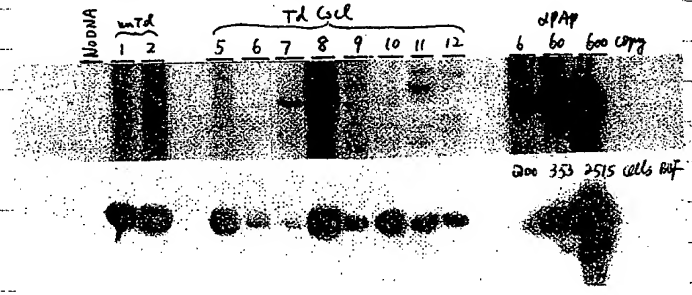
Primitive BFU-E (Day 18)
(9 or more multi-clustered)

For 2PCR: unTd: 25 (CFU-GM)
Td: 26-34 (26-32: CFU-G
33-34: BFU-E

150ul STE, 0.5 ul RNAse-DNAse 37°C 1
3.75 ul 20% SDS, 2.5 ul PK (10mg/ml) 37°C,

* Run hot PCR products ( ) on 6% Urea/Polyacrylamide Gel.

A, A GO 8wk LTC-IC



( )

34+ CD38− (2

all CFU-GM except 9 BFU-E

1 CFU-GM except 61 BFU-E)

hg and rice.

1-4 (1-2: CFU-GM

3-4: BFU-E)

5-24 (5-21: CFU-GM

22-24: BFU-E)

25 (CFU-GM)

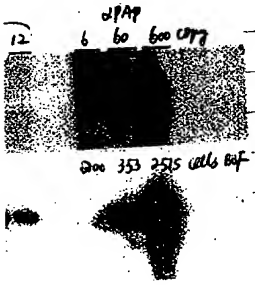
26-34 (26-32: CFU-GM

33-34: BFU-E)

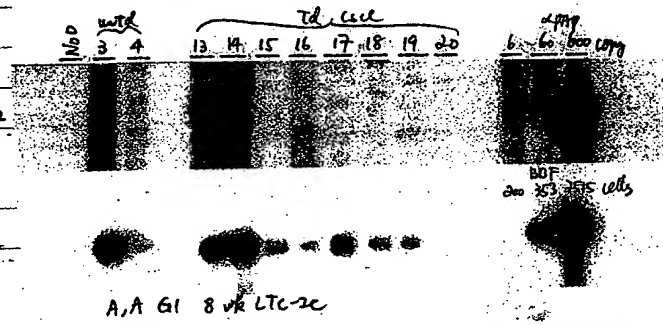
ul RNAse-DNAse 37°c 1 hr

2.5 ul PK (10mg/ml) 37°c O/N

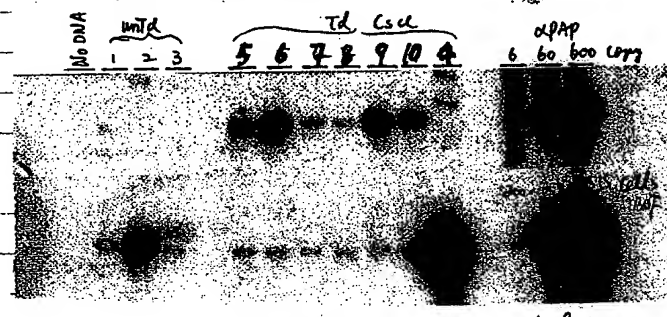
6% Urea/Polyacrylamide



A,A GO 8wk LTC-2c



A,A G1 8 wk LTC-2c



load 1/3

load 1/5

400 V

8°c day 2 hr

i0/G1

G0/G1

c, ½ back to culture
to me

13/7L6 /GMCSF/ SCF
25 ng/ml
Epo 1U/ml

37°c

1
G0/G1 (   )
2 wk, no colony)
(7 nice colony CFU-GM, 2 cluster
on stroma)
25 (nice colony CFU-GM)
17 (cluster on stroma or
loose in media)
4 (nice colony CFU-GM)
5 (cluster on stroma
16 (cluster on stroma or
floating)

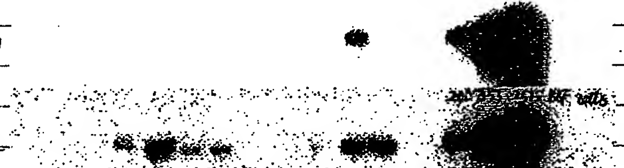
pick up colony. G0: un 1-4 ~~(CFU-GM)~~
Td 5-24
G1: un 1-3 (CFU-GM)
4 (cluster on stroma)
Td 5 (colony-cluster CFU-GM)
6-7 (cluster floating)
8-15 (cluster lonely on stroma)

150 μl STE, 0.5 μl RNase/DNase free 37°c 1 hr
3.75 μl 20% SDS, 2.5 μl PK (20mg/ml) 37°c O/N

& Run hot PCR products on 5% Urea/Polyacrylamide Gel

A,A G0 12 wk LTC-IC

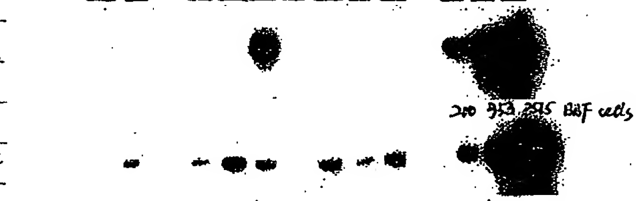
No DNA	unTd				TdCsCl αPAP				αPAP		
	1	2	3	4	5	6	7	8	6	60	600 copy

No.1


No.2

A,A G1 12 wk LTC-IC

No DNA	untd	TdCsCl αPAP							αPAP		
	1	2	3	4	5	6	7	8	6	60	600 copy

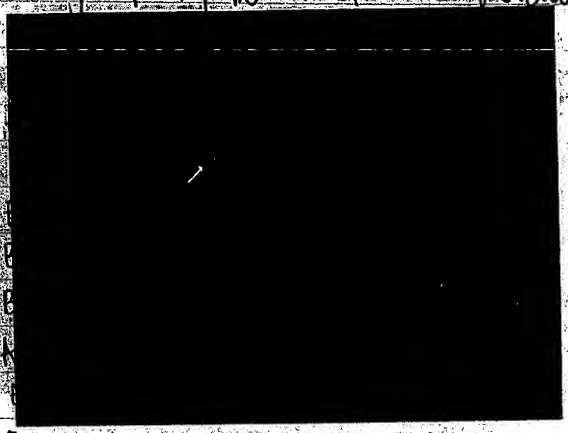
No.3


No.4

load 1/3

dry 80°c 2 hr

Hybridized probe on FISH slides were detected.



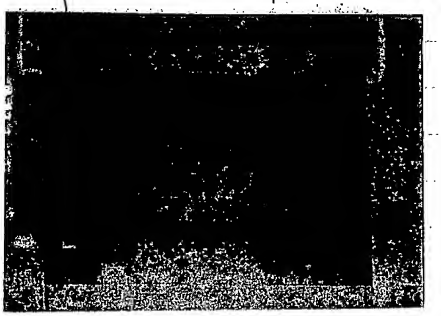
	+ IP	− IP	% IP
74	110	18%	
75	80	23%	
17	117	13%	
4	48	8%	
4	49	8%	
0	16	0%	
0	12	0%	

Bravo, E (

Dropped slides of G0 CCL (G0 CCA
G1 CCA
stored @ -20°C.
patients: Billy, V (VB)
Bravo, J (JB)

Ran antisense Hiv PCR product on Midi gel 0.8%
Performed Southern Blot

Split 293 and made 4 35mm plate for titering
my dAPP CCL vector.



Qiagen of GFP plasmid.
PPT O/N.
loaded a 200ml culture into one column!
→ overloaded column!
therefore lost a lot of plasmid.

hybridized probe to G0/G1 slides.

Resuspended GFP plasmid pellet in TE.
Quantitated
Yield only 60ug/ml
Therefore only a total of 60 ug!
But SC still could get 4 plates out of my 60ug.

Went to FISH lab to detect probe.

Experiment #2: FISH

Objective: Determine if aPAP vector actually integrated into genome of transduced CD34+ cells residing in G0.

Results:

	+MP	-MP	% MP	+IP	-IP	% IP
VB *Untd G0*	-	-	<1%	-	-	<1%
VB (D35) *G0-CCL*	3	19	14%	30	301	9%
VB (D35) *G0-CCL*	4	29	12%	22	210	9%
VB (D35) *G1-CCL*	-	-	N.D.	-	-	N.D.
JB (D23) *G0-CCL*	5	29	15%	24	232	9%
JB (D23) *G0-CCL*	5	21	19%	13	82	14%
JB (D23) *G1-CCL*	4	24	14%	22	178	11%

Detected probe on FISH slide

Results:

	+MP	-MP	%MP	+IP	-IP	%IP
Untd G0 (VB)			0%			0%
Td G0 cell (VB)	2	20	9%	22	145	13%
Td G0 CELL (VB)	1	11	8%	25	107	19%
Td G0 cell (VB)	1	14	7%	17	105	14%
Td G0 cell (VB)	1	15	6%	14	91	13%

Made up MC culture media:
Total Volume = 10mL
IMEM 8mL
20% FCS 2mL
IL3 10ng/mL 10µl
GMCSF 50ng/mL 2µl

Prehybridized Blot.

Performed cindy's MC colony: Halofeud C Oxide 2
→ LTC-IC plate

Trypsin-EDTA: Each 15mL twice, preadded 5mL IMDM + 0.5mL FCS. Removed media in well and placed with tweezers. Then 0.2mL Trypsin was added and let sit for 1min 15sec. Added 1.5mL media from 15mL tube to rinse the well. Repeated one more time to clean the well as good as possible. Then added 2mL fresh plain IMDM to MSC well.

GOCD34+fish.xls

Patient	G0? G1?	Weeks Post Transduction	% +ive MP	% +iv IP (<3)	Comments
Billy, V.	G0	4	9% (2/20)	13% (22/145)	VB Td on
Billy, V.	G0	4	8% (1/11)	19% (25/107)	
Billy, V.	G0	5	14% (3/19)	9% (30/301)	
Billy, V.	G0	5	12% (4/29)	9% (22/210)	
Billy, V.	G1	5	N.D.	N.D.	No metaphase spreads
Billy, V.	G0	6	7% (1/14)	7% (8/105)	
Billy, V.	G0	6	6% (1/15)	9% (9/91)	
Bravo, J.	G0	3	15% (5/29)	9% (24/232)	JB Td on
Bravo, J.	G0	3	19% (5/21)	11% (12/112)	
Bravo, J.	G0	3	18% (4/18)	11% (19/150)	
Bravo, J.	G1	3	14% (4/24)	11% (33/178)	
Bravo, J.	G1	3	16% (3/16)	7% (12/170)	
Bravo, J.	G0	4	10% (3/26)	12% (24/170)	
Bravo, J.	G0	4	14% (4/25)	10% (21/184)	

Pelleted Qiagen prep ~~of~~
Washed w/ 70% EtOH
Resuspended in a total of 1mL TE
(a 100mL culture!)
Quantitated by spec.
C] = 0.520ug/uL. ∴ total = 520ug

Pelleted 293 genomic DNA. in microcentrifuge
@ 15,000 RPM for 40min.
Washed w/ 70% EtOH
Resuspended in 100 λ of TE
Heated sample to allow for better suspension
Quantitated by spec.
C] = 1 ug/uL ∴ Total = 100ug
260/280 = 1.74

Also Hybridized probe to FISH slides G./G.
(and one Frias, Francisco slide)
Allowed for hybridization o/n @ 37°C in
tissue culture incubator.

Pelleted FISH probe (stored @ -70°C. over my
vacation).
washed w/ 70% EtOH
Dried and resuspended in a total of
15λ.
Stored @ -20°C.

Detected Probe on CD34+ Go slides.

Results:

	+MP	−MP	% MP	+IP	−IP	% IP
All Patient JB			<1%			<1%
Untd Go						
Go CCL ( )	3	26	10%	24	170	12%
Go CCL ( )	4	18	18%	19	158	11%
Go CCL ( )	4	25	14%	21	184	10%
G1 CCL ( )	3	16	16%	12	170	7%
	5	20	20%	19	181	9.5%
Frag, F						

→ Colcemid blocked FISH boosted culture

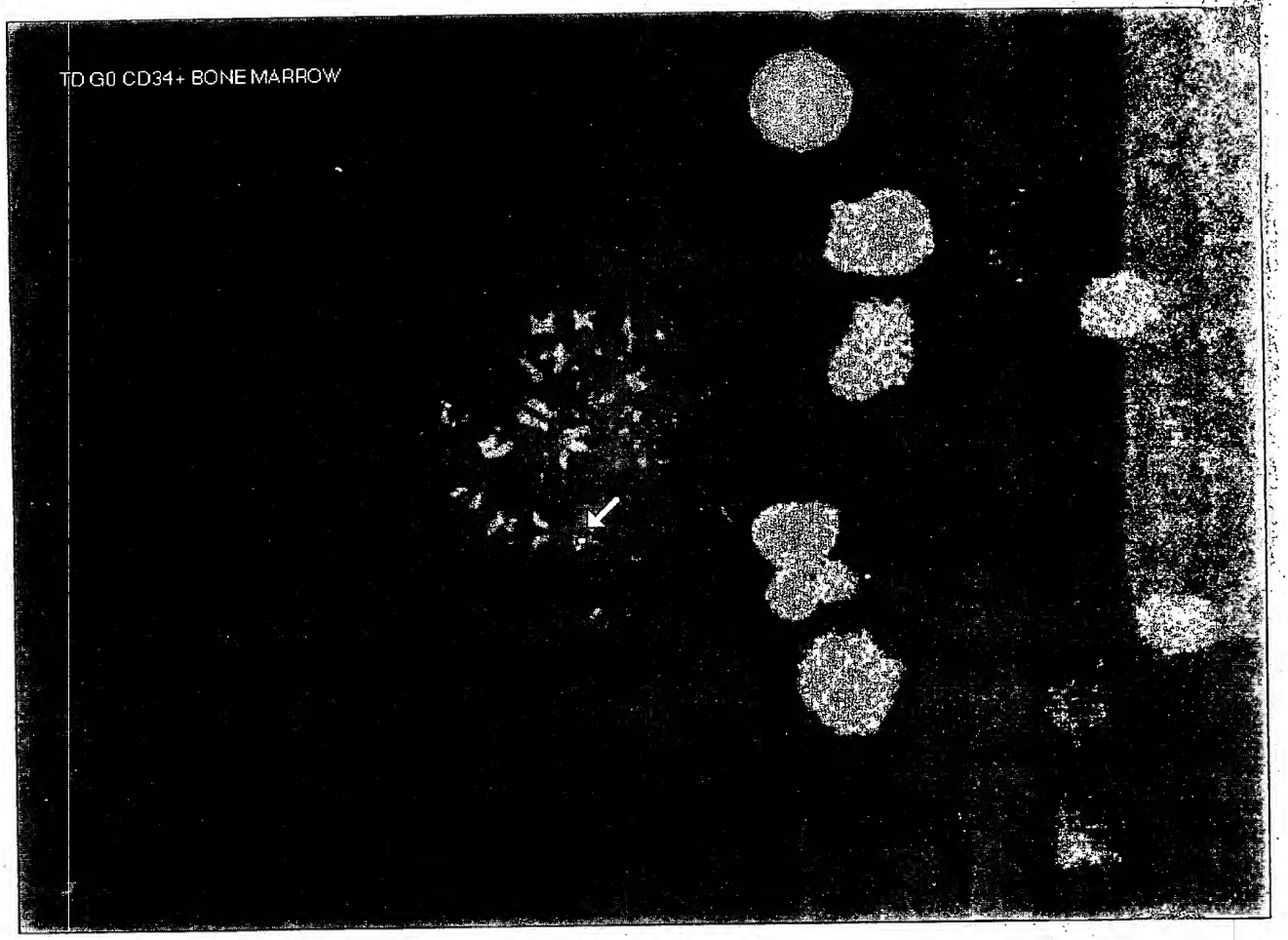
Set up another dsense PCR w/ newly extracted 293 DNA.

Genomic @ 100ng/λ		x12
10X Buffer	2.5λ	30λ
DLASP @ 10uM	.625λ	7.5λ
RPCP @ 10uM	.625λ	7.5λ
dNTP @ 2.5mM	2λ	24λ
Taq	.25λ	3λ
MgCl2 @ 25mM	2λ	24λ
dH2O	16λ	192λ

Total Rxn = 25λ

Set program @ 98° 5'
80° 1'
94° 40" } 30 cycles
64° 40"
72° 1'
72° 5'
4° 2 hrs.

Left margin fragments:
500ug
crocentrifuge
r suspension
100ug
ides G0/G1
(e)
@ 37°C in
overnight
fac &


TD G0 CD34+ BONE MARROW


UNTD G0 CD34+ BONE MARROW

Bone Marrow today!

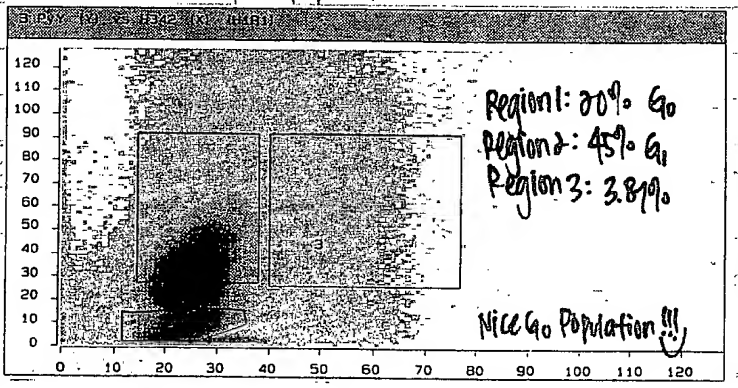
Patient:

97-32-31 4
GILLIARD, JEANNETTE
F / B 05/19/1964

Clarisha ~~good Yield!!! of CD34+.~~

Total Volume: 30 mL
→ 2mL for Lu Jiao
→ 18mL for Isolation of CD34+.
Count on Mononuclear cells = 250,000,000 cells.
Count of Total CD34+ = 3×10^6 cells.
Stored @ 4° in 50% FCS / 50% IMDM.
→ will select for G_0/G_1 tomorrow!

Made new concentration batch of Hst + Pyronin Stain.
Stained as usual.
FACS sort G_0/G_1 populations.



TACA

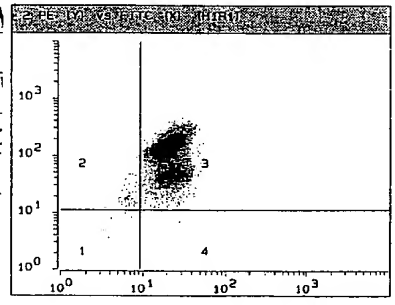
36,000 cells each well.
CSC1 (pooled SCA LL) 3CA each well.

Sc asked me to calculate % CD34+ from mononuclear cells from donor to donor.

Patient	Volume BM	# Mononuclear	# Total CD34+	% CD34+
Valentino	15ml	1.00E+08	1.60E+06	1.6
Bravo	44ml	4.00E+08	4.30E+06	1.075
Meiser	38ml	2.80E+08	2.50E+06	0.892857
Alexander	30ml	2.00E+08	2.80E+06	1.4
Kanata	50ml	2.70E+08	3.30E+06	1.222222
Thompson	40ml	2.50E+08	3.40E+06	1.36
Gilliard	18ml	2.50E+08	3.00E+06	1.2

∴ Approx. 1% CD34+

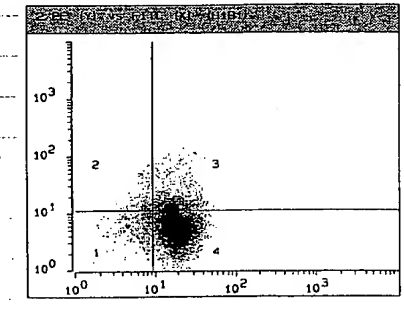
FACS analysis of CD34+CD38- pop in the Go/G1 CD34+ cells sorted on ... (patient: Gilliard, Jeannette).
washed aliquoted cells in ~ 1ml of FACS Buffer.
FACS Buffer: PBS + 0.1% Sodium azide
+2% FCS
Diluted Ab 4:1 in 1ml media. CD34+/CD38- (Becton Dickinson)



Stats Panel
EVENTS: 40276 counts
TIME: 129 secs
RATE: 312/sec
SOURCE: SACAPRI7.003
MODE: Free Run
PROTOCOL: FITCPE.SAC
LISTMODE: <none>
SAMPLE: G1 CD34/38
EXPERIMENT: CD34/38 Staining

Stats PE (Y) vs FITC (X) SACAP

Region	Counts	%
1	161	0.42
2	358	0.93
3	37792	98.30
4	136	0.35



Stats Panel
EVENTS: 40521 counts
TIME: 157 secs
RATE: 253/sec
SOURCE: MOFLO
MODE: Listmode 50000
PROTOCOL: FITCPE.SAC
LISTMODE: I\SACAPRI7.001
SAMPLE: GO CD34/38
EXPERIMENT: CD34/38 Staining

Stats PE (Y) vs FITC (X) SACAP

Region	Counts	%
1	1757	4.66
2	1062	2.82
3	7386	19.60
4	27479	72.92

Washed + fix CD34+ cells patient Alexander, Tracy
→ Replated + replaced @ 37°C

Fish Boosted Total CD34+ (1wk week)

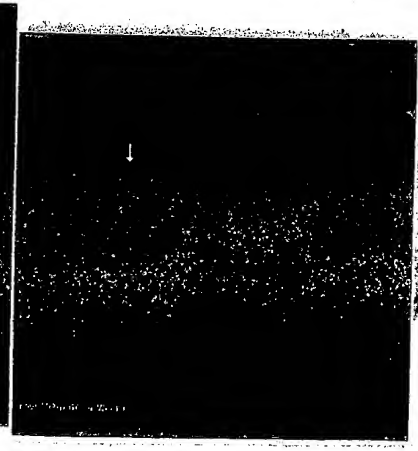
Collected Boosted CD34+ CM (G0/G1)

Dropped CM slides (2wk) → G0/G1
Could not Harvest Encapsidations Today!!!
→ CPE not up to 50% yet.

Harvested Encapsidations.
2 tubes (5 plate/tube)
Proceeded w/ Protocol as described by challenge/Wong.
After adding FCS. stored @ -20°C

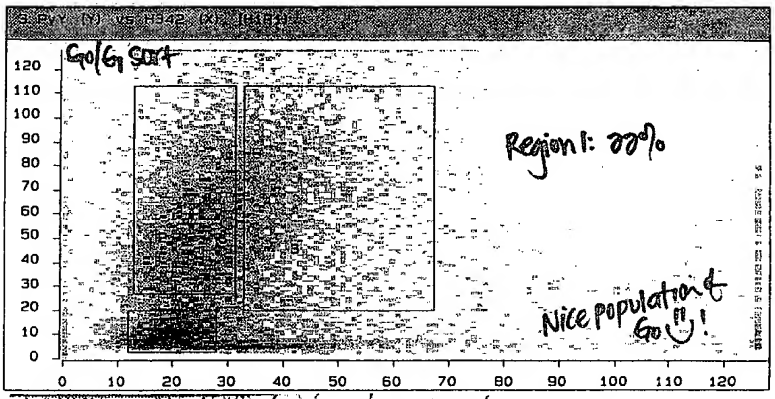
Dropped TM slides (1wk) → Total CD34+

Hybridized dPAP probe to 2week/4week G0 CD34+
Patient: Mean Cynthia



# of CD34+ cell = 3.5 million
gave 500,000 to priscilla.
Shred @ 4° in 50% Iscove / 5% FCS o/N.

Stained CD34+ w/ Hrechst & Pyronin.
(Before staining aliquoted 80,000 out total CD34+ cells)



Cindy 50,000 G_0 100,000 G_1
Me 70,000 G_0 70,000 G_1

Set up my wells as follows:

Plate 1:

	G_0	G_1
	Untrtd 10,000	Untrtd 10,000
Td w/ 60λ CCL (for 30,000) 30λ CCL (for 10,000)	Td (60λ) 20,000	Td (60λ) 20,000
	Td (60λ) 20,000	Td (60λ) 20,000

Plate 2:

MC	MC	Total CD34+
Untrtd (30λ) 10,000 G_0	Untrtd (30λ) 10,000 G_1	
Td (30λ) 10,000	Td (30λ) 10,000	Td (60λ) 20,000

FACS sort G_0/G_1 populations after staining w/ Hoechst-Pyronin

After sort,

G_0 = 144,575

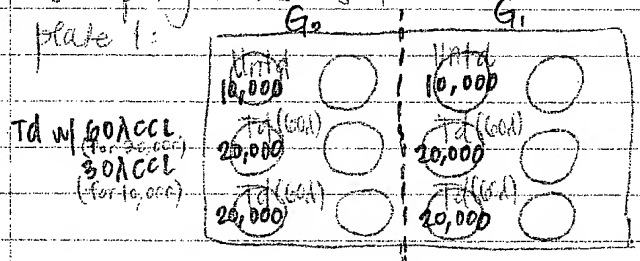
G_1 = 163,326

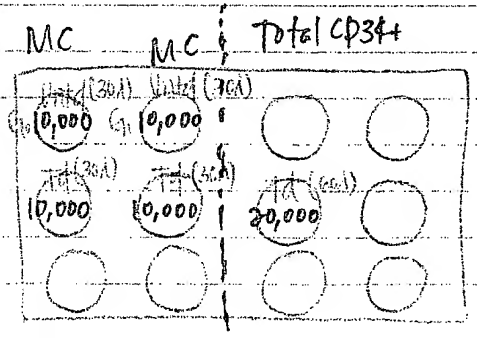
Divided cells among Cindy and I.

Cindy	80,000 G_0	100,000 G_1
Me	70,000 G_0	70,000 G_1

Set up my wells as follows:

plate 1:





(5λ)

nd shield.

Vector processing

Resuspended cell pellet in 10mL pH8 Tris
Froze/thawed 1x → Next 2x more.
Sonicated 6x @ 30sec.
Adjusted pH of the stock to 8-8.5 using sterile 1M Tris pH9.5.
Volume of lysate= 11mL
Added 1M MgCl2 → final 1mM = 11λ
Added 4.5λ Benzonase 60'
4.5λ Benzonase another 60'
Added 1.1mL 10X trypsin → 1X
Added 1.1mL DOC 10% → 1%
Vortexed.
Incubated @ 37°C for 30'
Sonicated.
Added ~6.8g CsCl
Adjusted RI to 1.4 (density).
Loaded onto centrifuge w/ CL, Lai(2), SO, SC pooled in mine!!!
Will harvest

Donor: Mercado, O.
CD34+CD38- cells...
Transduced on 7.8.98
w/ 5.96 CsCl dpap
FISH HARVEST:
Week 4:
Week 6
Week 8

30λ (90,000 cells.

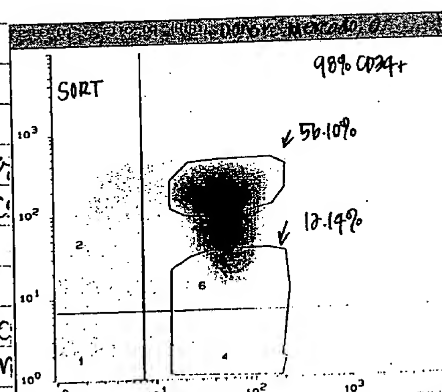
EROS
15E+07
14.34

vector checked Centrifuge OK

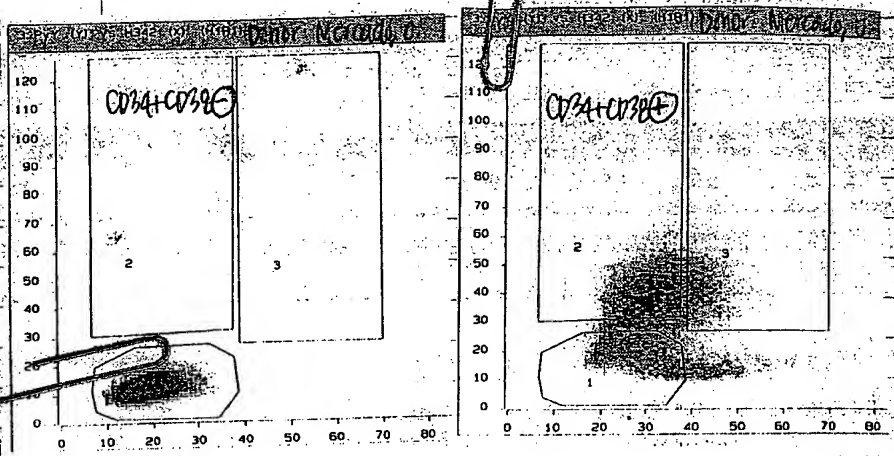
Bone Marrow Today!
Cindy isolated CD34+ ~8x10^6 cells!
Patient : Mercado, Orfedalia 98-26-16-5
F/W 03/22/1970

BFRB
uL
480
480
480

CD34/CD38- Sort.
Resuspended FACS Buffe
Diluted 50λ Ab → 75λ FAC
Mixed into same tube.
Incubated on ice for 45'
washed w/ 2.5mL FAC
TR w/ CW 5/98 CsCl v



292 | Go/G1 analysis of CD34+CD38- population.



→ Definitely 2 different cell populations - 98% of all CD34+CD38- cells are in G0 !!!

Gradient ... ,ml

Beginning mixed too well???

totally clear!

dispersed faint band

Density is quite high !!!

VECTOR	CWRAPAP		
HARVESTED	7/9/98		
FRACTION	RI	DENSITY	COMMENT
1	1.3576	1.2463	TOP
2	1.3586	1.2571	
3	1.3615	1.2886	
4	1.363	1.3049	
5	1.365	1.3266	
6	1.3674	1.3527	
7	1.377	1.4570	Vector Band
8	1.3771	1.4580	Vector Band
9	1.3775	1.4624	Vector Band
10	1.3725	1.4081	
11	1.386	1.5547	
12	1.3906	1.6047	

Bone marrow Today!

Patient:

98-29-18 5
LEROS, RICARDO
M / W 12/20/1976

Christine